IN THE CLAIMS

Please amend the claims as follows:

1 (Currently Amended): ~~An image forming characteristics measuring~~ A method ~~in which at least one image forming characteristic~~ of adjusting an image forming state of a pattern image projected onto an object via a projection optical system ~~is measured~~, said method comprising:

[[a]] measuring ~~process in which~~ information related to wavefront aberration of said projection optical system ~~is measured~~ at one measurement point at the least in a field of said projection optical system; and

[[a]] optimizing a weighting function to compensate an error of said pattern image, and calculating ~~process in which at least one targeted image forming characteristic is calculated~~ adjustment information in an adjusting unit that adjusts the image forming state of said pattern image, based on said ~~measuring of~~ information related to wavefront aberration and a Zernike sensitivity table ~~of said targeted image forming characteristic that is prepared in advance~~ corresponding to projection conditions of said pattern image.

2 (Currently Amended): The ~~image forming characteristics measuring~~ method according to Claim 1 wherein

in ~~said~~ calculating ~~process, when said targeted image forming characteristic include image forming characteristics of a plurality of types, said image forming characteristics of a plurality of types included in said targeted image forming characteristic are each calculated, based on said measuring of wavefront aberration and a Zernike sensitivity table for each of said image forming characteristics of a plurality of types~~ said adjustment information, data related to a relation between an adjustment amount of said adjusting unit and a change in coefficients of each term in a Zernike polynomial is used.

3 (Currently Amended):The ~~image forming characteristics measuring~~ method according to ~~Claim 1~~ Claim 2 wherein ~~, said method further comprising:~~

~~a making process in which conditions are set in order to make a Zernike sensitivity table, based on information on a pattern subject to projection by said projection optical system and said targeted image forming characteristic, and a Zernike sensitivity table of said targeted image forming characteristic that corresponds to information related to a given aberration is made, based on information related to said projection optical system and information related to said given aberration, prior to said measuring process~~ in order to adjust the image forming state of said pattern image, adjustment information related to at least an optical element of said projection optical system is calculated.

4 (Currently Amended):The ~~image forming characteristics measuring~~ method according to Claim 3 wherein

~~said information related to said projection optical system includes numerical aperture of said projection optical system, illumination condition, and wavelength of illumination light~~ in order to adjust the image forming state of said pattern image, adjustment information related to illumination light used for projection of said pattern image is calculated.

5 (Currently Amended):The ~~image forming characteristics measuring~~ method according to Claim 3 wherein

~~in said making process, when said targeted image forming characteristic include image forming characteristics of a plurality of types, a Zernike sensitivity table for each of said image forming characteristics of a plurality of types that correspond to said information~~

~~related to aberration is made~~ said projection conditions include at least an illumination condition of a pattern arranged an object plane of said projection optical system.

6 (Currently Amended):The ~~image forming characteristics measuring~~ method according to ~~Claim 1, further comprising:~~ Claim 5 wherein

~~a displaying process in which information related to said targeted image forming characteristic that has been calculated is displayed~~ when different pattern images are each projected by said projection optical system, said adjustment information is calculated using a Zernike sensitivity table for each of said pattern images.

7 (Currently Amended):The ~~image forming characteristics measuring~~ method according to ~~Claim 1~~ Claim 6 wherein

said Zernike sensitivity table is a table in which a predetermined value of aberration is given to each term in a Zernike polynomial and ~~said~~ a targeted image forming characteristic of said projection optical system is calculated for a plurality of terms in said Zernike polynomial.

8 (Currently Amended): The ~~image forming characteristics measuring~~ method according to ~~Claim 7~~ Claim 1 wherein

~~a first information related to a pattern subject to projection by said projection optical system and a second information related to a projection condition of said pattern are used when making said Zernike sensitivity table~~ in order to adjust the image forming state of said pattern image, adjustment information related to at least one of an optical element of said projection optical system and illumination light used for projection of said pattern image is calculated.

9 (Currently Amended):The ~~image forming characteristics measuring~~ method according to Claim 8 wherein

~~said second information includes numerical aperture of said projection optical system and an illumination condition of said pattern~~ the optical element of said projection optical system is moved, based on said calculated adjustment information.

10 (Currently Amended):The ~~image forming characteristics measuring~~ method according to ~~Claim 7~~ Claim 9 wherein

~~when different patterns are each projected by said projection optical system, said targeted image forming characteristic is calculated by making a Zernike sensitivity table for each of said patterns~~ a characteristic of said illumination light is changed, based on said calculated adjustment information.

11 (Currently Amended): The ~~image forming characteristics measuring~~ method according to ~~Claim 7~~ Claim 10 wherein

~~when said targeted image forming characteristic includes image forming characteristics of a plurality of types, the calculation is performed using a Zernike sensitivity table for each of said image forming characteristics~~ the characteristic of said illumination light includes wavelength.

12 (Currently Amended): The ~~image forming characteristics measuring~~ method according to ~~Claim 7~~ Claim 1 wherein

~~when a plurality of projection conditions are settable on projection of a pattern by said projection optical system, said targeted image forming characteristic is calculated using a~~

~~Zernike sensitivity table for each of said projection conditions~~ said projection conditions include at least an illumination condition of a pattern arranged on an object plane of said projection optical system .

13 (Currently Amended)~~:An adjusting~~ The method ~~of an exposure apparatus that transfers a pattern onto an object via a projection optical system, said method including~~ according to Claim 12 wherein

~~a measuring process in which a targeted image forming characteristic of said projection optical system is measured using said image forming characteristics measuring method according to Claim 1~~ when different pattern images are each projected by said projection optical system, said adjustment information is calculated using a Zernike sensitivity table for each of said pattern images .

14 (Currently Amended):~~An image forming characteristics adjusting~~ The method ~~in which an image forming characteristic of a projection optical system is adjusted, said method including~~ according to Claim 1 wherein

~~a measuring process in which a targeted image forming characteristic is measured using said image forming characteristics measuring method according to Claim 1; and~~

~~an adjusting process in which said projection optical system is adjusted based on measurement results of said image forming characteristic~~ for the calculation of said adjustment information, the least-squares method is used, and

said Zernike sensitivity table is a table in which a predetermined value of aberration is given to each term in a Zernike polynomial and a targeted image forming characteristic of said projection optical system is calculated for a plurality of terms in said Zernike polynomial.

15 (Currently Amended):The ~~image forming characteristics adjusting~~ method according to Claim 14 wherein

~~said projection optical system comprises a plurality of optical elements that include a specific optical element for adjustment, and~~

~~adjustment of said projection optical system is performed by deciding a targeted adjustment amount of said specific optical element using a relation expression between said measured image forming characteristics, parameters that denote a relation between adjustment of said specific optical element and a change in image forming characteristics of said projection optical system, and said targeted adjustment amount of said specific optical element, and adjusting said specific optical element according to said targeted adjustment amount that has been decided~~ information related to wavefront aberration of said projection optical system is measured at each of a plurality of points within a predetermined area, in which said pattern image is projected, in a field of said projection optical system, and

for the calculation of said adjustment information, the measurement information is used.

16 (Currently Amended):An exposure method in which a pattern is transferred onto an object via a projection optical system, said method including

~~an adjusting process in which an image forming characteristic of said projection optical system is adjusted~~ calculating adjustment information in an adjusting unit that adjusts an image forming state of a pattern image projected onto said object via said projection optical system, using said ~~image forming characteristics adjusting~~ method according to ~~Claim 14~~ Claim 1; and

[[a]] transferring ~~process in which~~ said pattern ~~is transferred~~ onto said object ~~using said projection optical system whose image forming characteristic is adjusted~~ by controlling said adjusting unit based on said calculated adjustment information.

17 (Currently Amended):The exposure method according to Claim 16 wherein

~~said image forming characteristic is adjusted by deciding an adjustment amount of at least one optical element, based on data of a relation between an adjustment amount of an optical element of said projection optical system and a change in its image forming characteristics, and said measured image forming characteristic, and by driving said optical element according to said adjustment amount that has been decided~~ said adjustment information is calculated, based on said information related to wavefront aberration, said Zernike sensitivity table, and data related to a relation between an adjustment amount of said adjusting unit and a change in coefficients of each term in a Zernike polynomial.

18 (Currently Amended):~~An image forming characteristics adjusting~~ The method ~~in which an image forming characteristic of a projection optical system is adjusted, said method including:~~ according to Claim 1 wherein

~~a measuring process in which a targeted image forming characteristic is obtained using said image forming characteristics measuring method according to Claim 1; and~~

~~said image forming characteristic is adjusted by driving an optical element of said projection optical system, based on data of a relation between an adjustment amount of said optical element and a change in coefficients of each term in a Zernike polynomial, and said measured wavefront aberration~~ in order to adjust the image forming state of said pattern image, at least one optical element of said projection optical system is moved, and

an adjustment amount of said at least one optical element is calculated as said adjustment information, based on said information related to wavefront aberration, said Zernike sensitivity table, and data related to a relation between an adjustment amount of said at least one optical element and a change in coefficients of each term in a Zernike polynomial.

19 (Currently Amended): An exposure method in which a pattern is transferred onto an object via a projection optical system, said method including

~~an adjusting process in which an image forming characteristic of said projection optical system is adjusted using said image forming characteristics adjusting~~ calculating adjustment information in an adjusting unit that adjusts an image forming state of a pattern image projected onto said object via said projection optical system, using the method according to Claim 18; and

[[a]] transferring ~~process in which~~ said pattern ~~is transferred~~ onto said object ~~using said projection optical system whose image forming characteristic is adjusted~~ by controlling said adjusting unit based on said calculated adjustment information.

20-63 (Canceled)

64 (Original):An image forming characteristics adjusting method in which at least one image forming characteristic of a projection optical system is adjusted, said method including:

a measuring process in which information related to wavefront aberration of said projection optical system is measured; and

said image forming characteristic is adjusted by driving an optical element of said projection optical system, based on data of a relation between an adjustment amount of said

optical element and a change in coefficients of each term in a Zernike polynomial, and said information related to wavefront aberration.

65 (Original):The image forming characteristics adjusting method according to Claim 64 wherein

said information related to wavefront aberration is expressed in a Zernike polynomial, and different weighting is performed on a plurality of terms in said Zernike polynomial to decide said adjustment amount of said optical element, in order to adjust an image forming characteristic of a plurality of types of said projection optical system.

66 (Original):An exposure method in which a pattern formed on a mask is transferred onto an object via a projection optical system, said exposure method comprising:

an adjusting process in which at least one image forming characteristic of said projection optical system is adjusted using said image forming characteristics adjusting method according to Claim 64; and

a transferring process in which said pattern is transferred onto said object using said projection optical system whose image forming characteristic is adjusted.

67-72 (Canceled)

73 (Currently Amended): An exposure apparatus that transfers a pattern onto an object via a projection optical system, said exposure apparatus comprising:

an adjusting unit that adjusts an image forming state of a pattern image projected onto said object via said projection optical system; and

a computing unit that ~~obtains a targeted image forming characteristic~~ optimizes a weighting function to compensate an error of said pattern image, and calculates adjustment information in said adjusting unit, based on information related to wavefront aberration of said projection optical system and a Zernike sensitivity table corresponding to projection conditions of said pattern image ~~that is obtained by giving a predetermined value of aberration to each term in a Zernike polynomial and calculating said targeted image forming characteristic of said projection optical system in each of a plurality of terms in said Zernike polynomial; and~~

~~an adjusting unit that adjusts at least one image forming characteristic of said projection optical system based on one of said information related to wavefront aberration and said targeted image forming characteristic that has been calculated~~.

74 (Currently Amended):The exposure apparatus according to Claim 73 wherein

~~said Zernike sensitivity table is made using a first information related to a pattern subject to projection by said projection optical system and a second information related to a projection condition of said pattern set when said pattern is projected~~ for the calculation of said adjustment information, data related to a relation between an adjustment amount of said adjusting unit and a change in coefficients of each term in a Zernike polynomial is used.

75 (Currently Amended):The exposure apparatus according to Claim 74 wherein

~~said second information includes numerical aperture of said projection optical system and an illumination condition of said pattern~~ said adjustment information includes an adjustment amount related to at least one of movement of an optical element of said projection optical system and a characteristic of illumination light used for projection of said pattern image.

76 (Currently Amended): The exposure apparatus according to ~~Claim 73~~ Claim 75 wherein

~~said computing unit calculates said targeted image forming characteristic using the Zernike sensitivity table for each said pattern when different patterns are each projected by said projection optical system~~ said projection conditions include at least an illumination condition of a pattern arranged on an object plane of said projection optical system .

77 (Currently Amended): The exposure apparatus according to ~~Claim 73~~ Claim 76 wherein

~~when said targeted image forming characteristic includes image forming characteristics of a plurality of types, said computing unit uses the Zernike sensitivity table for each of said image forming characteristics to calculate said targeted image forming characteristic~~ when different patterns are each transferred via said projection optical system, said adjustment information is calculated using a Zernike sensitivity table for each of said patterns.

78 (Currently Amended): The exposure apparatus according to Claim 73 wherein

~~when a plurality of exposure conditions are settable on projecting said pattern, said computing unit uses the Zernike sensitivity table for each of said exposure conditions to calculate said targeted image forming characteristic~~ said adjustment information includes an adjustment amount related to at least one of movement of an optical element of said projection optical system and a characteristic of illumination light used for projection of said pattern image.

79 (Currently Amended): The exposure apparatus according to ~~Claim 73~~ Claim 78 wherein

~~said adjusting unit adjusts said image forming characteristic by deciding an adjustment amount of at least one optical element, based on data of a relation between an adjustment amount of an optical element of said projection optical system and a change in its image forming characteristics, and said measured image forming characteristic, and by driving said optical element according to said adjustment amount that has been decided~~ said projection conditions include at least an illumination condition of a pattern arranged on an object plane of said projection optical system.

80 (Currently Amended): The exposure apparatus according to Claim 73 wherein

~~said adjusting unit adjusts said image forming characteristic by driving an optical element of said projection optical system, based on~~ for the calculation of said adjustment information, data of a relation between an adjustment amount of ~~said~~ an optical element and a change in coefficients of each term in a Zernike polynomial~~, and information related to said wavefront aberration~~ is used, and

in order to adjust the image forming state of said pattern image, said optical element is moved based on said calculated adjustment information .

81 (Currently Amended): A device manufacturing method including a lithographic process, wherein

in said lithographic process, said adjusting unit is controlled based on said calculated adjustment information, and ~~in order to transfer~~ a pattern ~~of a mask~~ is transferred onto a substrate via said projection optical system, using [[an]] the exposure apparatus according to Claim 73 ~~having a projection optical system, an image forming characteristic of said~~

~~projection optical system is adjusted, based on information related to wavefront aberration of said projection optical system, and a Zernike sensitivity table that is obtained by giving a predetermined value of aberration to each term in a Zernike polynomial and calculating a targeted image forming characteristic of said projection optical system in each of a plurality of terms in said Zernike polynomial~~.

82 (Original):An exposure apparatus that transfers a pattern onto an object via a projection optical system, said exposure apparatus comprising:

a storage unit that stores data related to a relation between an adjustment amount of an optical element of said projection optical system and a change in coefficients of each term in a Zernike polynomial; and

an adjusting unit that adjusts at least one image forming characteristic of said projection optical system based on information related to wavefront aberration of said projection optical system and said data.

83 (Original):The exposure apparatus according to Claim 82 wherein

said information related to wavefront aberration is expressed in a Zernike polynomial, and said adjusting unit decides said adjustment amount of said optical element by performing different weighting on a plurality of terms in said Zernike polynomial to adjust said image forming characteristic of a plurality of types of said projection optical system.

84 (Previously Presented): A device manufacturing method including a lithographic process, wherein

in said lithographic process, in order to transfer a pattern of a mask onto a substrate using an exposure apparatus having a projection optical system, an image forming

characteristic of said projection optical system is adjusted, based on data of a relation between an adjustment amount of an optical element of said projection optical system and a change in coefficients of each term in a Zernike polynomial, and information related to wavefront aberration of said projection optical system.

85 (Currently Amended): An exposure apparatus that transfers a pattern onto an object via a projection optical system, said exposure apparatus comprising:

a computing unit that obtains a targeted image forming characteristic when a plurality of exposure conditions are settable on projecting said pattern by said projection optical system, based on information related to wavefront aberration of said projection optical system and a Zernike sensitivity table related to ~~that is obtained by giving a predetermined value of aberration to each term in a Zernike polynomial and calculating~~ said targeted image forming characteristic of said projection optical system ~~in each of a plurality of terms in said Zernike polynomial~~ ,as a linear sum of coefficients of each term in a Zernike polynomial that is decided based on said information related to wavefront aberration and said Zernike sensitivity table; and

an exposure control unit that sets an optimum exposure condition for said pattern, based on said targeted image forming characteristic that has been calculated for each of said exposure conditions.

86 (Original):The exposure apparatus according to Claim 85 wherein

said exposure conditions include numerical aperture of said projection optical system and an illumination condition of said pattern.

87 (Previously Presented): The exposure apparatus according to Claim 85 wherein

said computing unit obtains said targeted image forming characteristic using the Zernike sensitivity table for each of said exposure conditions, and when said targeted image forming characteristic includes image forming characteristics of a plurality of types, the Zernike sensitivity table is also used.

88 (Previously Presented): The exposure apparatus according to Claim 87 wherein

said computing unit calculates said targeted image forming characteristic when different patterns are projected by said projection optical system, using the Zernike sensitivity table for each of said patterns, and

said exposure control unit sets an optimum exposure condition for each of said different patterns, based on said targeted image forming characteristic that has been calculated for each of said patterns.

89 (Currently Amended): The exposure apparatus according to Claim 85 wherein

said computing unit obtains said targeted image forming characteristic using [[a]] the Zernike sensitivity table ~~made~~ for each of said exposure conditions, and also when different patterns are each projected by said projection optical system, calculates said targeted image forming characteristic using [[a]] the Zernike sensitivity table ~~that is made~~ for each of said patterns, and

said exposure control unit sets an optimum exposure condition by said different patterns, based on said targeted image forming characteristic that has been calculated for each of said patterns.

90-93 (Canceled)

94 (Previously Presented): The image forming characteristics adjusting method according to Claim 64 wherein

in order to adjust said image forming characteristic, an adjustment amount of said optical element is decided using a Zernike sensitivity table of an image forming characteristic of said projection optical system that becomes an evaluation item.

95 (Previously Presented): The image forming characteristics adjusting method according to Claim 94 wherein

in order to adjust said image forming characteristic, an adjustment amount of said optical element is decided using the least-squares method.

96 (Previously Presented): The image forming characteristics adjusting method according to Claim 95 wherein

when different patterns are each projected by said projection optical system, an adjustment amount of said optical element is decided using the Zernike sensitivity table for each of said patterns.

97 (Previously Presented): The image forming characteristics adjusting method according to Claim 95 wherein

when said image forming characteristic that becomes an evaluation item includes image forming characteristics of a plurality of types, an adjustment amount of said optical element is decided using the Zernike sensitivity table for each of said image forming characteristics of a plurality of types.

98 (Previously Presented): The image forming characteristics adjusting method according to Claim 95 wherein

when a plurality of projection conditions are settable on projection of a pattern by said projection optical system, an adjustment amount of said optical element is decided using the Zernike sensitivity table for each of said projection conditions.

99 (Previously Presented): The image forming characteristics adjusting method according to Claim 95 wherein

when a plurality of illumination conditions are settable on projection of a pattern by said projection optical system, an adjustment amount of said optical element is decided using the Zernike sensitivity table for each of said illumination conditions.

100 (Previously Presented): The image forming characteristics adjusting method according to Claim 64 wherein

information related to wavefront of said projection optical system is measured at each of a plurality of points within a predetermined area, in which a pattern is projected, in a field of said projection optical system, and the measurement information is used for adjustment of said image forming characteristic.

101 (Previously Presented): The image forming characteristics adjusting method according to Claim 64 wherein

in order to adjust said image forming characteristic, an adjustment amount of said optical element is decided using a weighting function.

102 (Previously Presented): The image forming characteristics adjusting method according to Claim 101 wherein

for decision of said adjustment amount, the least-squares method is used.

103 (Previously Presented): The image forming characteristics adjusting method according to Claim 102 wherein

for decision of said adjustment amount, a Zernike sensitivity table is used, said Zernike sensitivity table being obtained by giving a predetermined value of aberration to each term in a Zernike polynomial and calculating an image forming characteristic that becomes an evaluation item of said projection optical system in each of a plurality of terms in said Zernike polynomial.

104 (Previously Presented): The image forming characteristics adjusting method according to Claim 102 wherein

information related to wavefront of said projection optical system is measured at each of a plurality of points within a predetermined area, in which a pattern is projected, in a field of said projection optical system, and the measurement information is used for decision of said image forming characteristic.

105 (Currently Amended): An exposure method in which a pattern is transferred onto an object via a projection optical system, said method comprising:

~~measuring information related to wavefront aberration of said projection optical system;~~

calculating a targeted image forming characteristic of said projection optical system for each of a plurality of exposure conditions settable when said pattern is projected by said

projection optical system, based on ~~said~~ information related to wavefront aberration of said projection optical system and a Zernike sensitivity table relatd to a targeted image forming characteristic of said projection optical system, as a linear sum of coefficients of each term in a Zernike polynomial that is decided based on said information related to wavefront aberration and said Zernike sensitivity table; and

setting an optimum exposure condition with respect to said pattern, based on said targeted image forming characteristic calculated for each of said exposure conditions, and transferring said pattern onto said object.

106-109 (Canceled)

110 (Currently Amended): An exposure method in which a pattern is transferred onto an object via a projection optical system, said method comprising:

deciding coefficients of each term in a Zernike polynomial based on information related to wavefront aberration of said projection optical system; and

calculating an image forming characteristic that becomes an evaluation item of said projection optical system, based on said decided coefficients of each term in a Zernike polynomial, and a Zernike sensitivity table that corresponds to a pattern to be transferred onto said object and an illumination condition of the pattern, as a linear sum of said decided coefficients of each term in a Zernike polynomial and said Zernike sensitivity table.

111 (Canceled)

112 (Currently Amended): The exposure method according to ~~Claim 111~~ Claim 110 wherein

said Zernike sensitivity table is obtained by giving a predetermined value of aberration to each term in said Zernike polynomial and calculating an image forming characteristic of said projection optical system in each of a plurality of terms in said Zernike polynomial.

113 (Previously Presented): The exposure method according to Claim 112 wherein

said image forming characteristic that becomes an evaluation item is calculated at each of a plurality of points within a predetermined area, in which a pattern is projected, in a field of said projection optical system.

114 (Currently Amended): An exposure method in which a pattern is transferred onto an object via a projection optical system, said method comprising:

optimizing a weighting function to compensate an error of a pattern image projected onto said object, and calculating adjustment information of said projection optical system, based on information related to wavefront aberration of said projection optical system and a Zernike sensitivity table that corresponds to a pattern to be transferred onto said object and an illumination condition of the pattern; and

adjusting said projection optical system based on said calculated adjustment information.

115 (Canceled)

116 (Currently Amended): The exposure method according to ~~Claim 115~~ Claim 114 wherein

for the calculation of said adjustment information, the least-squares method is used.

117 (Previously Presented): The exposure method according to Claim 116 wherein an adjustment amount of an optical element of said projection optical system is calculated as said adjustment information, based on data of a relation between the adjustment amount of the optical element of said projection optical system and a change in coefficients of each term in a Zernike polynomial.

118 (Previously Presented): The exposure method according to Claim 117 wherein coefficients of each term in a Zernike polynomial are decided by measuring wavefront aberration of said projection optical system, and

for the calculation of said adjustment amount, said decided coefficients of each term in said Zernike polynomial are used.

119 (Previously Presented): The exposure method according to Claim 118 wherein said weighting function is a function to perform weighting on said decided coefficients of each term in said Zernike polynomial.

120 (Previously Presented): The exposure method according to Claim 119 wherein said adjustment amount is calculated by optimizing said weighting function so that said error does not exceed a permissible value at each of a plurality of points within a predetermined area, in which a pattern is projected, in a field of said projection optical system.

121 (Previously Presented): The exposure method according to Claim 120 wherein said Zernike sensitivity table is obtained by giving a predetermined value of aberration to each term in a Zernike polynomial and calculating an image forming

characteristic of said projection optical system in each of a plurality of terms in said Zernike polynomial.

122 (Currently Amended): An exposure apparatus that transfers a pattern onto an object via a projection optical system, said exposure apparatus comprising:

a measuring unit that measures information related to wavefront aberration of said projection optical system, and

a computing unit that decides coefficients of each term in a Zernike polynomial based on said ~~measured~~ information related to wavefront aberration, and calculates an image forming characteristic that becomes an evaluation item of said projection optical system, based on said decided coefficients of each term in a Zernike polynomial and a Zernike sensitivity table that corresponds to a pattern to be transferred onto said object and an illumination condition of the pattern, as a linear sum of said decided coefficients of each term in a Zernike polynomial and said Zernike sensitivity table.

123 (Canceled)

124 (Currently Amended): The exposure apparatus according to ~~Claim 123~~ Claim 122 said Zernike sensitivity table is obtained by giving a predetermined value of aberration to each term in said Zernike polynomial and calculating an image forming characteristic of said projection optical system in each of a plurality of terms in said Zernike polynomial.

125 (Previously Presented): The exposure apparatus according to Claim 124 wherein

said image forming characteristic that becomes an evaluation item is calculated at each of a plurality of points within a predetermined area, in which a pattern is projected, in a field of said projection optical system.

126 (Currently Amended): An exposure apparatus that transfers a pattern onto an object via a projection optical system, said apparatus comprising:

a computing unit that optimizes a weighting function to compensate an error of a pattern image projected onto said object, and calculates adjustment information of said projection optical system, based on information related to wavefront aberration of said projection optical system and a Zernike sensitivity table that corresponds to a pattern to be transferred onto said object and an illumination condition of the pattern; and

an adjusting unit that adjusts said projection optical system based on said calculated adjustment information.

127 (Canceled)

128 (Currently Amended): The exposure apparatus according to ~~Claim 127~~ Claim 126 wherein

for the calculation of said adjustment information, the least-squares method is used.

129 (Previously Presented): The exposure apparatus according to Claim 128 wherein

an adjustment amount of an optical element of said projection optical system is calculated as said adjustment information, based on data of a relation between the adjustment amount of the optical element of said projection optical system and a change in coefficients of each term in a Zernike polynomial.

130 (Previously Presented): The exposure apparatus according to Claim 129 wherein coefficients of each term in a Zernike polynomial are decided by measuring wavefront aberration of said projection optical system, and

for the calculation of said adjustment amount, said decided coefficients of each term in said Zernike polynomial are used.

131 (Previously Presented): The exposure apparatus according to Claim 130 wherein said weighting function is a function to perform weighting on said decided coefficients of each term in said Zernike polynomial.

132 (Previously Presented): The exposure apparatus according to Claim 131 wherein said adjustment amount is calculated by optimizing said weighting function so that said error does not exceed a permissible value at each of a plurality of points within a predetermined area, in which a pattern is projected, in a field of said projection optical system.

133 (Previously Presented): The exposure apparatus according to Claim 132 wherein said Zernike sensitivity table is obtained by giving a predetermined value of aberration to each term in a Zernike polynomial and calculating an image forming characteristic of said projection optical system in each of a plurality of terms in said Zernike polynomial.

134 (Previously Presented): The exposure apparatus according to Claim 133, further comprising:

a setting unit that is capable of changing an illumination condition of said pattern, wherein

when said illumination condition is changed by said setting unit, said computing unit uses a Zernike sensitivity table corresponding to said changed illumination condition.

135 (Previously Presented): The exposure apparatus according to Claim 126, further comprising:

a measuring unit that measures wavefront aberration of said projection optical system, said measuring unit being at least partly attachable to an exposure apparatus main body including said projection optical system.

136-138 (Canceled)

139 (Currently Amended): A device manufacturing method, wherein

a device pattern is transferred onto a photosensitive object using said exposure method according to ~~Claim 105~~ Claim 16.

140 (Previously Presented): A device manufacturing method, wherein

a device pattern is transferred onto a photosensitive object using said exposure method according to Claim 110.

141 (Previously Presented): A device manufacturing method, wherein

a device pattern is transferred onto a photosensitive object using said exposure method according to Claim 114.

142 (Currently Amended): A program that makes a control computer of an exposure apparatus that transfers a pattern onto an object via a projection optical system execute a predetermined process, said program making said control computer execute:

a deciding procedure in which coefficients of each terms of a Zernike polynomial are decided based on information related to wavefront aberration of said projection optical system; and

a calculating procedure in which an image forming characteristic that becomes an evaluation item of said projection optical system is calculated, based on said decided coefficients of each term of a Zernike polynomial and a Zernike sensitivity table that corresponds to a pattern to be transferred onto said object and an illumination condition of the pattern, as a linear sum of said decided coefficients of each term in a Zernike polynomial and said Zernike sensitivity table.

143 (Currently Amended): A program that makes a control computer of an exposure apparatus that transfers a pattern onto an object via a projection optical system execute a predetermined process, said program making said control computer execute:

a calculating procedure in which a weighting function to compensate an error of a pattern image projected onto said object is optimized, and adjustment information of said projection optical system is calculated, based on information related to wavefront aberration of said projection optical system, and a Zernike sensitivity table that corresponds to a pattern to be transferred onto said object and an illumination condition of the pattern; and

an adjusting procedure in which said projection optical system is adjusted based on said calculated adjustment information.

144 (Previously Presented): A program that makes a control computer of an exposure apparatus that transfers a pattern onto an object via a projection optical system execute a predetermined process, said program making said control computer execute:

a measuring procedure in which information related to wavefront aberration of said projection optical system is measured; and

an adjusting procedure in which an image forming characteristic of said projection optical system is adjusted by driving an optical element of said projection optical system, based on data of a relation between an adjustment amount of said optical element and a change in coefficients of each term in a Zernike polynomial, and said information related to wavefront aberration.

145 (Currently Amended): A program that makes a control computer of an exposure apparatus that transfers a pattern onto an object via a projection optical system execute a predetermined process, said program making said control computer execute:

a calculation procedure in which an image forming characteristic for each of a plurality of exposure conditions is calculated, based on coefficients of each term in a Zernike polynomial that is decided based on information related to wavefront aberration of said projection optical system, and a Zernike sensitivity table corresponding to each of said plurality of exposure conditions that are settable when projecting said pattern by said projection optical system, as a linear sum of said decided coefficients of each term in a Zernike polynomial and said Zernike sensitivity table; and

a transferring procedure in which an optimum exposure condition for said pattern is set based on said image forming characteristic calculated for each of said exposure conditions, and said pattern is transferred onto said object.